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Vol. 4, No. 2, pp. 83-113

April 29, 1916

LIFE INSURANCE FOR PROFESSORS
A STUDY OF THE PROBLEM OF PROTECTION FOR
THE FAMILIES OF SALARIED MEN

BY

CHARLES E. BROOKS



UNIVERSITY OF CALIFORNIA PRESS
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LIFE INSURANCE FOR PROFESSORS

A STUDY OF THE PROBLEM OF PROTECTION FOR THE
FAMILIES OF SALARIED MEN

BY
CHARLES E. BROOKS

It is the experience of many men to find, when they undertake to make provision for their families by life insurance, that the premium rates charged by the insurance companies are so high that it is almost impossible for them to pay for an amount of insurance which is adequate to the needs of their families. This state of affairs bears with peculiar hardship upon those whose income is in the form of salary, a class to which the university professor usually belongs. May it not be possible that, by the establishment of an insurance office which shall give attention to the needs and resources of professors, life insurance may be furnished to them at rates which will bring it within their power effectually to assure the discharge of their obligations to their dependents in the event of death?

The problem which such an organization will have before it may be framed as follows: How should the principle of life insurance be applied, in order to provide in the most economical and efficient manner for those risks which are caused by the uncertain duration of life, among a group of people whose economic and social conditions present the marked degree of uniformity which is the case among college faculties?

In any attempt to devise a system of life insurance adapted to the needs of a given group of people, a most important step is to effect a separation of those purposes which can be obtained

only through insurance from such purposes as investment and saving for old age, which can be provided for in other ways.

If, between the ages of thirty and thirty-five, the young professor, having attained a salary which will enable him to marry and support a family with strict economy, takes stock of his prospects, he finds that if his health remains good and he can continue to be an effective worker, he may look forward to a productive period of from thirty to thirty-five years with a gradually increasing salary, followed by a modest pension for the remainder of his life.

The young man who contemplates the obligations which he has assumed at the threshold of his professional career and weighs the resources out of which he must provide them must recognize that the uncertainty of life confronts him with two distinct risks: the risk that his early death will cause deprivation to those who have a right to expect that he will take care of them; and the risk that he will live beyond the term of his productive life, and be no longer able to take care of himself. His most important economic problem, one whose solution is a difficult and delicate task, is to give due weight to these conflicting risks, and to determine what proportion of his income may be devoted to the daily needs and desires of his family; what to provision against the destitution of his family if he die young; and what to provision against the time when his wages will cease to support him. The advice to heed the example of the thrifty ant was given long before the invention of life insurance, and has been so long incorporated in moral precepts that there is real danger that the partly selfish desire to store up savings will receive an unfair proportion of earnings, and that adequate life insurance will be sacrificed for the sake of accumulation. Perhaps it is possible to arrive at some helpful conclusions on this problem. The mortality table shows that a man of thirty has slightly better than an even chance of living to be retired, which we may assume to occur at the age of sixty-five; so that, on a basis of probability alone, saving for old age and life insurance against the loss of wages seem to be nearly equally deserving of attention. But the mortality table has something further to say on this subject. Men who attain the age of sixty-five will, on the aver-

age, survive about eleven years longer, while those who die between the ages of thirty and sixty-five fall short, on the average, by fifteen years of supporting their families as long as they would have been able to do if they had lived. Even if it is assumed that a man living after his retirement needs an annual income equal to that which his family require in the event of his death, still the surviving man could be supported for his average remaining lifetime by the investment of only about three-quarters of the sum which would be required for the support of a family for the average fifteen years of dependency.

Thus we see that when we consider only the probabilities of the two cases a larger provision for life insurance than for old age appears desirable. When to these considerations we add that the needs of a family which is suddenly deprived of support are extremely urgent, and that there is no other way to provide for them than by life insurance; but that, on the other hand, the provision which must be made for old age is for a remote contingency, for which a man has the whole period of his working years to prepare, it is reasonable to regard the duty of insurance as far more pressing than the duty of provision for old age. At the least, we may conclude that the young man at the beginning of his career is extremely negligent if he fail to provide life insurance which will be adequate to the needs of his family in the event of his early death; but that he may quite properly delay for a while the beginning of the accumulation of a reserve for his own old age, with the expectation of being able to provide for it from the increasing resources of his maturity.

From the wider point of view of society as a whole, the problem of adequate provision for the education and equipment for life of the rising generation far transcends in importance that of caring for the much smaller group of the superannuated. When the necessary cost of providing insurance adequate to compensate the family of a man who dies in early life is considered, it is evident that the ability of a man on the salary of a young professor to save is limited. It is very doubtful if it be possible for him to make sufficient provision for life insurance and at the same time to begin the accumulation of a savings fund in the earlier years of his professional life. It thus becomes increas-

ingly evident, as the various phases of the problem are considered, that protection of dependents is of fundamental importance, and that it should be given a prominent place of its own, and not treated as a mere by-product of a scheme of savings and investment. The importance of effecting a complete separation of the two, so that each may be treated on its own merits, becomes evident. It is impossible for a man to make a wise apportionment of his expenditure between insurance and investment, unless he know what return a given contribution to either will yield, and unless he be free to chose the proportion in which he requires each.

As we approach the problem of deciding what provision should be made for the professor's family in the event of his death, there is a choice of method. One way is to regard the family as a unit, consisting of a vaguely defined group of dependents, entitled to receive for its maintenance a proportion of his salary up to the time of retirement, and needing indemnity if the salary be cut short by death. Under this view the aim of life insurance must be to continue the family income up to the time when it would have ceased by retirement. Provision for the family after the age of retirement, like provision for the professor's own old age, is to be regarded as a problem of savings, and not of life insurance. From this point of view, two requirements of insurance become very obvious. In the first place, an indemnity is required only in the event of death occurring before retirement, and as earning power continues up to death or retirement, life insurance should deal only with the period from entry to the expiration of the term at which retirement would occur. In the second place, as it is not likely that the sacrifice required to provide for the payment of premiums would be less in the early years than in the latter, there is no reason for the limitation of the payment of premiums to a portion of the earning lifetime, nor should premiums be called for after the date of retirement. The event to be insured against is loss of salary after the death of the person insured, and in order to secure perfect insurance the amount of indemnity must be proportional to the number of years' salary lost. In other words, if the death occur early in life the amount of indemnity required is large, because the obli-

gation which the professor has assumed toward his family remains almost entirely unfulfilled; but if the death occur near the end of his working life, his obligations have been almost completely fulfilled, and the amount of indemnity required is small.

The salient facts of mortality, as they affect a group of 1000 families which are dependent upon the shares that they receive of the salaries of 1000 professors thirty years of age when they come under consideration, are the following: Of the 1000 families 580 will not require any assistance from insurance, as their income will continue uninterrupted throughout the period to retirement; and the remaining 420 families will become dependent for a greater or shorter period, for that number of bread-winners will fail to survive to the end of their productive lives.

The deaths will be distributed as follows:

Age group	Number of deaths in the five-year period
30-34	42
35-39	43
40-44	46
45-49	51
50-54	61
55-59	78
60-64	99

Let us now show what can be done, by the application of life insurance, to provide, for those families which are deprived of support, indemnity which shall be proportionate to the actual amount of deprivation suffered. In order to have a basis for calculation, let us make the assumption that each professor during his productive lifetime contributes to the support of his family, as distinct from his own living and professional expenses, the equivalent of \$1,000 each year. Then, in order to assure to his family the continuation of this support after his death, he should provide by life insurance for the payment to his family of an income of \$1,000 annually from the date of his death until the date at which he would have retired had he lived. We have just seen that of the four hundred and twenty families needing indemnity forty-two, or 10 per cent, will be deprived of their

support during the first five years, and must be provided for by the equivalent of \$1,000 income for from thirty to thirty-five years. In order to assure such an income, indemnity amounting to an average of about \$20,000 for each of the forty-two families must be provided; somewhat more than \$20,000 for those which become dependent in the first year, and somewhat less for those which become dependent in the fifth year. In the second and third five-year periods, eighty-nine deaths occur, and an equal number of families require indemnity for periods ranging from twenty to thirty years. When the period for which support must be provided has diminished to twenty years the capital value of the \$1,000 a year income required has diminished to something under \$15,000, so that the amount of benefit to be paid at death should diminish to a similar sum. In the case of those men whose death occurs in their fiftieth year of age, insurance equivalent to \$1,000 per year for fifteen years must be provided, and the capital amount of such an income is almost precisely \$12,000. During the first twenty years, as the men insured increase in age from thirty to fifty, one hundred and eighty-two deaths will occur, requiring indemnity to as many families; a minimum amount of \$12,000 being required in the cases where death occurs at age fifty. In the next ten-year period, as the insured progress from fifty to sixty years of age, one hundred and thirty-nine deaths will occur, and a similar number of families must be provided with incomes, ranging from fifteen to five years and varying in capital value from \$12,000 to about \$4,700. Almost a quarter (99 out of 420) of all the deaths will occur during the last five years of the period under consideration, but these deaths will affect families which have been provided for to almost the full ability of the men who supported them, and consequently the indemnity that they require is small, varying from \$3,800 down to \$1,000 in those cases where death occurs in the sixty-fourth year of age.¹

¹ In this and the following calculations it is assumed that the mortality will be according to the American Experience Table, and that compound interest at the rate of $3\frac{1}{2}$ per cent per annum can be obtained upon accumulating funds. These assumptions are used for two reasons: partly because they are safe, conservative assumptions, such that there is no doubt that plans based upon them could be actually realized in practice; and partly in order to facilitate comparisons with the usual terms of life insurance, which are based upon the same assumptions.

The wide variation in the amount of indemnity needed by families whose bread-winners die at different ages is very clearly exhibited by the above figures. Another way of looking at the facts is to note that the total commuted value of the indemnity required by four hundred and twenty families is \$4,453,000. Of this amount \$2,250,000, or about one-half, is required for the benefit of only one hundred and thirty-one, or less than one-third, of the families; while one hundred and seventy-six, or about 42 per cent, of the families require only \$830,000, or less than 19 per cent of the total amount of indemnity. When we look at the problem in this light, it becomes very evident that any plan of life insurance which provides a constant amount of indemnity, regardless of the time at which the indemnity becomes necessary, falls far short of meeting the requirements of families of the economic status that we are considering. It is perfectly clear that life insurance of the ordinary type will not furnish adequate protection against the danger of dying in the early years of life without including at the same time very much more than the protection needed in the case of one who dies toward the end of his earning period.

To meet the conditions described, by insurance, the direct and obvious thing to do is to provide an income which will take the place of that contributed from the salary of the professor and cease at the time his salary would have ceased if he had lived. This can be carried out most easily by what is called in actuarial language "yearly term insurance;" that is to say, each year's premium is intended to provide only for the claims that will occur during that year.

In the table on page 90 is shown in detail the indemnities needed year by year, and the premiums or contributions required to provide them, in order to furnish insurance in the form of an income of \$1,000 a year, beginning at the death of the person insured, and continuing to the date at which he would have been sixty-five years of age. In the first three columns are given, respectively, the year of insurance, the age attained by the insured during that year, and the number of annual installments required if death occur during that year. In the fourth column, headed "Commuted value of \$1,000 yearly income,"

I. INSURANCE BY YEARLY TERM PREMIUMS, TO PROVIDE \$1,000
ANNUAL INCOME FROM DEATH TO DATE AT WHICH
RETIREMENT WOULD HAVE OCCURRED.

(1) Year of Insurance	(2) Age attained by insured at beginning of year	(3) No. of Installments	(4) Commuted value of \$1,000.00 yearly income at 3½ per cent interest	(5) Net yearly term premium for \$1,000.00 income
1	30	35	\$20,701.00	\$168.65
2	31	34	20,390.00	167.67
3	32	33	20,069.00	166.89
4	33	32	19,736.00	166.24
5	34	31	19,392.00	165.45
6	35	30	19,036.00	164.53
7	36	29	18,667.00	163.93
8	37	28	18,285.00	163.14
9	38	27	17,890.00	162.62
10	39	26	17,482.00	161.91
11	40	25	17,058.00	161.42
12	41	24	16,620.00	160.72
13	42	23	16,167.00	160.14
14	43	22	15,698.00	159.51
15	44	21	15,212.00	159.17
16	45	20	14,710.00	158.66
17	46	19	14,190.00	158.51
18	47	18	13,651.00	158.27
19	48	17	13,094.00	158.26
20	49	16	12,517.00	158.51
21	50	15	11,921.00	158.72
22	51	14	11,303.00	158.79
23	52	13	10,663.00	158.55
24	53	12	10,002.00	157.84
25	54	11	9,317.00	156.59
26	55	10	8,608.00	154.45
27	56	9	7,874.00	151.28
28	57	8	7,115.00	146.66
29	58	7	6,329.00	140.24
30	59	6	5,515.00	131.72
31	60	5	4,673.00	120.52
32	61	4	3,802.00	106.08
33	62	3	2,900.00	87.67
34	63	2	1,966.00	64.48
35	64	1	1,000.00	35.63

is given the capital sum which, invested at $3\frac{1}{2}$ per cent, will just suffice for the payment of \$1,000 annually for the number of years indicated in column three. In column five, under the heading "Net yearly term premium per \$1,000 income" are stated the premiums which are sufficient, according to the American Experience Table of Mortality and $3\frac{1}{2}$ per cent interest, to provide insurance for one year at the age attained (column two) for the amount stated in column four. It will be noted that the yearly premium is not a fixed amount, but varies from age to age. It is fairly constant between the ages of thirty and fifty-five, but decreases rapidly after that. The table shows that if a man aged thirty wishes to assure his family an income of \$1,000 per year for the period from his death until the date when he would have retired, he must pay a premium of \$168.65 for the first year, \$167.67 the second year, and gradually decreasing amounts in the following years. In the year during which he reaches age forty his premium will be \$161.42, in the year in which he reaches age fifty his premium will be \$158.72, and for the year during which he reaches age sixty his premium will be \$120.52. It will diminish rapidly in the remaining years, and for the last year, at age sixty-four, a premium of \$35.63 is all that is required.

The yearly term plan of insurance is the simplest and most direct plan of life insurance that can be devised. Each year's premiums just suffice for the payment of the claims which fall due in that year, and there is no reserve accumulation. In the case of whole life insurance by the yearly term plan it is found that the premiums increase very rapidly with advancing age. The result is that persons insuring for their whole lives under this plan find as they reach old age that the yearly term premium required becomes prohibitive. It was to meet this objection that the level premium form of insurance was devised. As is shown in the table, for life insurance under the plan we have outlined the net yearly premiums decrease with advancing age, so that the condition which makes yearly term insurance undesirable for the whole life form does not exist in this case.

In the foregoing pages we have defined, somewhat arbitrarily, certain circumstances under which men in the conditions given

require life insurance, and we have shown how insurance can be employed to meet these precise conditions. We have outlined what we will call for convenience the first plan of insurance for professors. Let us now proceed to examine it in detail and to compare it critically with the ordinary system of insurance. This first plan of insurance consists briefly of an effort to adapt the amount of insurance which will become payable at the death of the person insured to the precise obligations which the deceased will leave unfulfilled. To carry out this idea it is assumed that the man who lives to attain the age of retirement and who has supported his family through that period has done for them all that he could reasonably have undertaken to do, and we have measured the loss caused by the death of a man before his retirement by the number of years' support which he has failed to give.

It will be seen, by reference to the table of premiums, that the cost of insurance of this kind is reasonable, and that it ought to be within the power of a man to assure his family an income after his death which will suffice for their necessities. Let us see how insurance of this kind compares with the ordinary life policy, in the case of a man of thirty years of age, contributing \$1,000 yearly for the support of his family. The highest premium which he would have to pay under this plan for an income of \$1,000 a year in case of his death is the premium for the first year, \$168.65, and the average yearly premium for the following twenty years is about \$163. Let us see what amount of ordinary life insurance an annual premium of \$168.65 will purchase. The net annual premium for ordinary life insurance at age thirty is \$17.10 per \$1,000 insurance. At that figure \$168.65 will pay for \$9,810 of insurance. We have already seen that if death occur between the ages of thirty and thirty-five the commuted value of \$1,000 annual income which the family of the insured would receive according to the proposed plan is about \$20,000, so that the man who had taken the ordinary life policy would leave his family in case of his death at this time only half of the necessary indemnity. If death occur at the age of forty-five it would require \$15,000 insurance to furnish indemnity equivalent to that which would be obtained under the

plan suggested; and even if death occur as late as in the fiftieth year of age, \$12,000 of life insurance would be needed to produce the income which that plan would supply. It is only in the case of those dying as late as the fifty-fourth year of age that the ordinary life insurance purchased for the annual premium stated will produce an income as great as that furnished under the above plan. Of course, it is quite evident that in the cases where death occurs in the years between ages fifty-five and sixty-four the ordinary life policy will produce the greater income. But we have seen that of 1,000 men aged thirty, 232 will die before age fifty-five; that is to say, considerably more than half of the families needing insurance will receive more under this plan than under the ordinary life plan, and most of these will receive very much more.

If, for the purpose of comparison, we consider the case of a man entering the insurance scheme at the age of forty the annual premium which this plan requires for insurance for \$1,000 income is \$161.42. This amount paid annually will purchase \$6,850 of ordinary life insurance at the American Experience $3\frac{1}{2}$ per cent net rate of \$23.50 per \$1,000. If in this case death occur in the first year \$6,850 will provide an income of only \$403 and if death occur at age fifty it will provide an income of \$577. It is only in the case of those dying at fifty-seven that this amount of insurance will purchase approximately \$1,000 income. Evidently, the advantage of this plan of insurance over the ordinary life plan is greater for those entering at middle age than it is for those entering earlier.

The reason for the unfavorable showing of the ordinary life policy is not far to seek. Under the plan proposed, premiums have been computed which will just suffice for the payment, in the case of those who die, of the indemnity which seems necessary. When the persons insured reach the age of sixty-five we have assumed that their obligations to their family have been fulfilled, and that no further insurance is necessary. Protection is furnished for the amount needed during the period in which it is needed, and at the expiration of that period the insurance ceases. No further premiums are called for from the insured and there is nothing on hand in the insurance fund. The ordi-

nary life policy, on the other hand, provides for a stated amount of insurance to be paid at the death of the person insured. The same benefit is paid no matter at what age the death occur. In order to provide for insurance under the ordinary life plan by equal annual premiums it is necessary to charge premiums higher in the earlier years than the actual cost of insurance during those years, and to accumulate the excess at interest, in order to make good the deficiency that would otherwise occur in the later years of life on account of the very high death rate of those years. If the man who had insured at age thirty for \$9,810 ordinary life insurance lives to be sixty-five years of age and desires to discontinue his insurance he finds that his policy is worth a few cents less than \$5,200, and this amount he can receive from the company upon surrendering his policy. In effect, the ordinary life policy requires the man who can afford to pay \$168.65 a year for life insurance to be content with much less life insurance than the needs of his family require through a considerable period of his life, in order that he may save \$5,200 by the time of his retirement.

The ordinary life policy, which is the form most commonly in use, requires a very much larger contribution of premiums in order to provide equivalent compensation; and the higher premium of the ordinary life policy is made necessary by the combination of a considerable element of investment with the protection furnished. It is because the ordinary life policy enforces an arbitrary ratio of investment to protection, which in most cases is disproportionate to the savings capacity of the professor, that it is not suitable to his requirements.

A very marked difference between the methods of life insurance, as generally conducted, and of fire insurance is clearly seen in a comparison of the contracts made by the two kinds of companies. The standard form of life insurance policy states the amount of insurance, and records the obligation of the company to pay that sum upon evidence that the person insured is dead. The fire insurance contract, on the other hand, is an agreement by the company to make good losses caused by fire; and the amount stated in the policy is a maximum limit, and will be paid only in the event of the destruction of property of equivalent

value. After a fire has occurred an examination is made to ascertain the precise amount of destruction, and the fire insurance company pays indemnity proportionate to the damage done. When a man whose life is insured dies, the life insurance company pays the full amount of the policy, and its efforts to ascertain whether the person receiving the money has actually suffered a loss are confined to guarding against the grosser forms of speculative insurance. The fire insurance companies base their payments of indemnity upon the actual damage done by fire because their experience has taught them that in the case of the majority of fires the damage is trivial. Many fires cause a considerable amount of damage, but those in which total destruction of the property insured occurs form only a small proportion of the fires.

Now it is obvious that the losses caused by death distribute themselves in very much the same way. Comparatively few men die in youth and early middle age, and they represent the total losses; in the middle years of life the number of deaths is higher, and these represent the partial losses because they have partly fulfilled their obligations to their dependents. The majority of men live through their working years and die in old age. From an economic point of view these are the trivial losses, for they have completed their work and the amount of real dependence which they leave is very small. The analogy with the cost of fire losses is so close as to suggest that a plan of life insurance which undertakes to proportion the amount of indemnity to the amount of loss sustained, as is done in the case of fire losses, would be an immense improvement over the plan of treating all deaths as total losses no matter at what age they occur. The cost of life insurance would be reduced in this way, just as the cost of fire insurance would be increased if all fires were regarded as total losses in the settlement of claims.

To regard deaths which occur in early life as causing total losses, those which occur in middle life as partial losses, and those which occur after retirement as trivial losses, is more than an analogy: it is really a true view of the facts, for by losses we mean economic losses caused by interruption of wage-earning power. It is because the ordinary life insurance plan provides

full indemnity for the partial and trivial losses, which occur with increasing frequency with advancing age, that the cost of insurance becomes so high in the latter years of life, and that the accumulation of reserve funds becomes necessary. If it sound harsh to speak of the deaths occurring in old age as causing trivial losses, the same facts may be stated in a different manner. The statement that the loss caused by the death of one who is no longer a wage-earner is negligible must stand, for it is true. In what light, then, must the payment of a considerable sum under a life insurance policy in such a case be regarded? Clearly it is not indemnity for loss of support. It is not really insurance at all. Of the two factors which combine to cause risk, one is zero, and the other is very small. There is no loss of wages because there are no wages, and there is comparatively little uncertainty regarding the duration of life of a man who has passed the age of retirement. The truth is that money collected as life insurance in the case of a man whose death occurs after retirement is more justly regarded as the realization of an investment. This view is strengthened by the fact that in the later years of life the reserve or cash value of an ordinary life policy falls very little short of the face amount of the insurance. Thus a \$1,000 policy of ordinary life insurance issued at age thirty which has been kept in force until the insured reaches age sixty-five has a cash value of \$530, and if it be kept in force ten years longer this is increased to \$700. The cash value increases rapidly thereafter, and becomes actually equal to the amount of insurance if the person insured reaches the age of ninety-six. The reserve fund which the company holds on account of such a policy is an accumulation of the premiums paid by the insured, and it is as really the property of the insured as if it had been accumulated in a savings bank and not by a life insurance company; and it is payable to him on demand and the surrender of his policy.²

² An examination of the customary policy will reveal that it contains essentially two contracts. One is an obligation of the insurer to pay a stated sum, called the amount of insurance, at the death of the insured. The other is, practically, a promise to pay on demand an accumulating fund. The true amount of insurance, that which is contributed in cooperation by all the group insured, is the difference between the cash surrender value (practically the same as the reserve) and the so-called amount of insurance.

We have compared the plan of insurance proposed with ordinary life policies based upon the payment of premiums annually until the death of the insured, as this is the form for which the annual premiums are the lowest. Endowment policies and life policies paid for by a limited number of premiums, of which the twenty-payment life is the most popular, differ from the ordinary life policy chiefly in the more rapidly accumulating reserve. For this reason they are even more unsuitable to the requirements and resources of the professor than the ordinary life plan.

Forms of life insurance which involve the accumulation of large reserve funds are open to criticism for another reason. As we have endeavored to make clear, such contracts are essentially a combination of insurance with investment. Even in the case of persons whose economic position enables them to provide insurance sufficient for their needs and in addition to save systematically for purposes of investment, it may fairly be questioned if an insurance office is the best medium for the handling of savings. Against the risk of loss by the early death of the wage earner, co-operative insurance is practically the only available method of provision, but there are many opportunities for investment open to the private individual, as well as many co-operative institutions designed purely for the care of savings. Life insurance is most successfully carried on by organizations of considerable magnitude, insuring a large number of lives, and involving the operation of an expensive plant. Much of the organization necessary for the conduct of a life insurance business is by no means necessary for the handling of savings funds, and it is therefore doubtful if the results obtained by the life insurance companies on the investment side can ever be as satisfactory as those obtained by institutions devoted entirely to the care of savings. It is true that the life insurance companies of the United States have made a magnificent record in the profitable and safe investment of their great reserve funds, but it must be remembered that this is not the whole story. The satisfactory interest rate obtained on the reserve fund is not a net return to the insured. Life insurance companies incur heavy expenses for the collection of premiums, and for the extension of their busi-

ness by advertising and by personal solicitation. In some cases they pay special insurance taxes and license fees. There is every reason to believe that that portion of the premium destined for investment bears its share of these insurance expenses. So long as it is impossible for the insured to know what portion of his premium is for investment, it will remain difficult for him to know whether he is getting a satisfactory investment or the contrary.

Let us now attack our problem from a different point of view. By abandoning the conception of the professor's family as a unit, and giving attention to the needs of the individuals of whom it is composed, we shall be led to formulate a second plan of insurance.

Most men of the class we are considering will feel that if they can provide adequately for the support and education of their children during their minority, in the event of their own deaths, it will be all that they can reasonably expect to do for them, but that they should make some provision which will assure to their widows an income sufficient for their maintenance as long as they may survive. Insurance which will provide surely for these conditions, and for nothing more, either in the form of accumulation of savings or in the form of payments if the beneficiaries intended to be protected no longer need protection, is the most economical that can be devised, and is the nearest approach that voluntary life insurance can make to the ideal of adjusting the indemnity to the actual loss. The precise need of each dependent can be supplied by an indemnity which shall take the form of an assured income, to be paid during the period of dependency, but to cease in the event of death. The form of life insurance called a reversionary annuity meets just such cases, and this is the form of insurance which will enable the salaried man to provide most surely for the risks of his death by the least present sacrifice.

The most important provisions of a contract for a reversionary annuity for the benefit of a wife are the following. That in the event of the death of the husband the widow receives a stated income, payable throughout her lifetime, however long that may be, but ceasing at her death. In the event of the death of the wife during the life of the husband the contract termi-

nates, as the insured is no longer required. To bring it most easily within the reach of a professor, such a contract may be paid for by equal annual premiums, payable only to the time of retirement, and ceasing, of course, in the event of the death of either the insured or his wife.

The premiums for reversionary annuities depend upon the ages of both the insured and the beneficiary, for the reason that the younger a beneficiary is the more likely she is to survive the insured. In Table II, which follows, the premiums are given for reversionary annuities in cases where husband and wife are of equal age, and in cases where the wife is five years younger than the husband. The premiums stated are payable annually, but

II. REVERSIONARY ANNUITIES

INCOME OF \$100.00 PAYABLE ANNUALLY SO LONG AS THE BENEFICIARY SURVIVES THE INSURED. LIMITED ANNUAL PREMIUMS, LAST PAYMENT WHEN INSURED IS SIXTY-FOUR.

Age of Insured	Beneficiary same age as insured	Beneficiary five years younger than insured
25	\$18.23	-----
30	19.21	\$21.92
35	20.66	24.02
40	22.78	27.16
45	26.01	31.78
50	31.05	39.17
55	40.42	52.72
60	66.12	90.10

III. ORDINARY WHOLE LIFE INSURANCE

NET PREMIUMS FOR \$1,000.00 INSURANCE PAYABLE AT DEATH. LIMITED ANNUAL PREMIUMS, LAST PAYMENT WHEN INSURED IS SIXTY-FOUR.

Age of Insured	Maximum number of premiums	Premium for \$1,000.00
30	35	\$18.72
35	30	22.28
40	20	27.37
45	20	35.07
50	15	47.77
55	10	72.26
60	5	141.86

in no case is any premium paid after the insured reaches age sixty-four. A table of rates for whole life insurance, premiums to cease at age sixty-four, is added for comparison. It will be seen that at the younger ages the premiums for the reversionary annuity of \$100 a year are comparable with the annual premiums for ordinary life insurance of \$1000, but that at the higher ages a \$100 reversionary annuity is considerably cheaper than a \$1000 life insurance policy. Thus at ages 35-35 \$100 reversionary annuity will cost \$20.66 annually, and a whole life policy with premium ceasing at age sixty-five \$22.28; whereas at ages 45-45 the annuity premium is \$26.01, contrasted with the twenty-payment life premium of \$35.07 at age forty-five. The life annuity which \$1000 will purchase at 3½ per cent interest by the American Experience Table of Mortality is much less than \$100 at all ages and varies from about \$50 annually for a person aged twenty-five to \$90 annually for a person aged sixty. At all ages there is very marked difference in favor of the reversionary annuity.

The reversionary annuity for the wife in the event of the death of the husband, which we have suggested, provides for the support of the wife after the death of the husband, whether the husband's death occurs before or after retirement. This is the plan which would probably appeal to the majority of men; but there is no reason why the benefit under this sort of policy may not be limited to apply only in those cases in which the man insured dies before the age of retirement. Such a modification would allow a considerable reduction in the premiums required, and would be desirable if the professor's retirement allowance provided for the continued support of his widow.

The provision for children, in the case of the death of their father during their dependent years, can most easily be made in the form of an income for each child for the years elapsing between the death of the parent and the date at which the child may be expected to have completed its education and to have become able to take care of itself. It will be seen that insurance of this sort is comparatively inexpensive. There are some technical difficulties which make it impracticable to provide for such insurance by equal annual premiums. The most practicable

plan is to adopt the yearly term insurance basis, the premium changing from year to year, and being determined by the age of the insured and the age of the child at the date of paying the premium. This plan has the slight disadvantage that premiums vary from year to year, but it has the advantage of allowing modification in the amount of insurance to meet varying needs. In Tables V and VI are given the premiums required for each year's insurance for an annual income of \$100, the first payment at the death of the insured and the last payment when the beneficiary attains the ages of sixteen and twenty respectively. The age of the parent is given at the side of the table and the age of the child at the top. For example, in order to find the premium for the year during which the insured reaches age forty-three and the beneficiary reaches age seven we look under seven and opposite forty-three, and find \$10.52.

We have now outlined the modifications which it is believed would produce life insurance much more suitable to the circumstances of the university professor than that which is offered by the established life insurance companies. Let us try to anticipate the criticisms which the representative of an old-line company might make. One point which such a man might raise would be to say that the forms of insurance proposed are not particularly novel. The first plan proposed, he would say, is nothing more or less than term insurance, which is offered by nearly all insurance companies, although not quite in the form that we have suggested. It is quite true that term insurance is offered by insurance companies, and that a man who knew what he wanted, and who refused to take a substitute, could secure insurance very nearly equivalent to the plan which we first suggested. One way of obtaining approximately the same result is to secure term policies of different amounts for terms of different lengths. Thus if a man aged thirty secured a thirty-five year term policy of \$5000, a thirty-year term policy of \$5000, a fifteen-year term policy of \$5000, and a ten-year term policy of \$5000 he would have insurance roughly equivalent to that which we found necessary to secure an annual income of \$1000 from the time of his death to the date at which he would have retired. The benefit under these policies in case of his death

would correspond roughly with the capital value of the \$1000 annuity desired, but there would remain to his beneficiary the difficulty of investing the proceeds in such a way as to produce just that annuity. The ten- and fifteen-year term policies he would probably have no difficulty in securing, as most companies issue them; the thirty- and thirty-five year term policies are unusual and he might have trouble in inducing the company which he preferred to issue them. He could be sure, however, that on every premium date he would be visited by an agent who would seek to convince him of the advantage of changing his insurance to the ordinary life form.

A more significant reply to the insurance man, whose argument we are considering, is, that while the companies do offer term insurance they do not make very great efforts to explain to people requiring insurance the desirability of using the term policy. Agents are not encouraged to advertise term insurance policies and they are paid smaller commissions on them than on ordinary life and endowment policies, so that it is not to the interest of the soliciting agents to urge term insurance. It is probably fair to say that the typical insurance agent mentions term insurance only as a last resort, when he is fully convinced that he cannot persuade his prospect to take an ordinary life or endowment policy. The mortality experience of the companies is not as favorable under term insurance as under whole life insurance, but this is the result of an adverse selection, which would hardly occur if term insurance were more extensively written. It may be suggested that it is to the advantage of the executive of a life insurance company to have the trust fund under its control grow as rapidly as possible; and that the term insurance policies, which require little or no reserve, do not add much to the importance of an insurance office as a financial institution. Whatever the reason may be, the fact remains that the general attitude of the life insurance companies toward term insurance is one of discouragement. It is for this reason that the establishment of an office which would make special efforts to point out the usefulness of term insurance in certain circumstances, and would provide such insurance, would confer a benefit upon a large number of men.

Another argument which the insurance man would be justified in using is to say that life insurance companies have experimented with a great many forms of insurance contracts designed to meet varying needs, but that their experience with these departures from the ordinary life policy and the endowment policy have not as a rule been encouraging. They find that the agent is handicapped by the necessity of explaining unfamiliar and complicated contracts and that he can work most successfully with the ordinary policy with which he and his client are both reasonably familiar. This argument is undoubtedly sound, but it must be remembered that during the past hundred years the insurance companies have devoted a great deal of ability and money to the training of agents to sell the ordinary forms of insurance and to educate the public to the acceptance of such forms. The demand for life insurance is natural, but the demand for the ordinary forms of insurance is to a certain extent artificial. The fact that the commercial companies find that they can conduct their business more profitably upon the ordinary plans, and that their clients prefer the ordinary plans, hardly seems to be a sufficient reason why an office seeking to furnish the most suitable insurance to a special class of persons should not try other forms of insurance.

The whole trend of our discussion has been to point out the desirability of separating investment from life insurance. In defense of the combination of investment with insurance it is frequently urged that life insurance in its ordinary form enforces saving, and that the regular payment of the insurance premium leads men to make savings which they would not otherwise make; so that, even admitting that more profitable investments for savings can be found than through the life insurance companies, nevertheless millions of dollars have been accumulated by the life insurance companies which would never have been saved without their assistance. In reply to this we may admit the desirability of saving in any form, without weakening our position that those who need insurance, but who are not able to make considerable saving, should be given an opportunity to secure insurance without the investment of an accumulation which they cannot afford.

The advocate of the insurance companies will point out that the companies have observed the desirability of the payment of insurance benefits in the form of annuities, or of incomes for definite periods, rather than the payment in one sum; and that they have very earnestly advocated policies payable in this way and have included in nearly all of their policies provision for payment in installments if the insured shall so direct or if the beneficiary shall so desire. Particular prominence has been given by insurance companies to a form of payment which is called continuous installments. Policies having this feature provide that, in the event of a claim the sum insured shall be payable in a specified number of equal annual (or monthly) payments, and in addition that the installments shall be continued to the beneficiary designated, after the specified number have been paid, so long as the beneficiary shall live. This is a very desirable form of policy, and comes much nearer to meeting the requirements which we are considering than the ordinary life policy payable in one sum. The continuous installment plan, however, provides for the payment of a certain number of installments whether the beneficiary whom it is intended to protect be living or not, and it is therefore considerably more expensive than the reversionary annuity which we have advocated. Although it is more desirable than the ordinary form, the whole-life continuous installment policy nevertheless contains the feature which makes ordinary life insurance so unsatisfactory, that is, the provision for full payment even though the insured die in old age, which must be regarded as a form of investment and not of true insurance.

In European countries, and especially in France, the business in annuity contracts of various forms has received a considerable development, but that has not been the case in the United States. Our insurance companies have made efforts to extend the use of annuities, but without marked success. The reasons for this state of affairs are not altogether clear, but two contributory causes may be mentioned. The rate of return possible under a life annuity depends upon two things: the interest rate which can be realized and the mortality among the annuitants. The insurance companies, in order to be secure in their business,

cannot promise more than a very conservative rate of interest on contracts which, like the annuities, are apt to cover long periods of time; and for this reason the return which they can offer does not compare favorably with the high return which many business men in America are able to secure on their capital. The result has been that Americans as a rule have not invested in annuities, and have desired to have their life insurance payable in full and not in installments. The very fact that the return from annuities is not large produces a condition which in turn reacts upon the insurance company and forces the return from annuities still lower. It is the fact that among the persons who do invest in annuities there is not experienced the ordinary rate of mortality. Persons whose health is in any way impaired will not invest in life annuities, and among those who do so invest there is an unusually large proportion of extraordinarily long-lived persons.

A large proportion of the clients of the insurance companies are business men whose beneficiaries frequently have opportunities of investment which promise a larger return than can be promised under installment contracts, but there is reason to believe that in many cases the temptation of high returns leads to unfortunate results. As a rule the beneficiaries of professors' life insurance are apt to be less able to invest the proceeds of their insurance to advantage than are those in the world of business, so that the plans of insurance providing fixed incomes which we have suggested are especially desirable for them.

It is important to point out that, although the low mortality of annuities is shown by experience, that experience has been with persons who have purchased annuities on their own lives. It is very probable that if reversionary annuities were used in the way we have advocated the annuitants would represent a fair sample of professors' wives, and would not on the average have a mortality rate very different from the general population. In order to guard against an adverse mortality in the case of the beneficiaries of reversionary annuities, one important restriction must be made. When such a policy has once been issued it is not possible to allow either the insured or the beneficiary to exercise any option to change the mode of settlement

or to substitute a new beneficiary. If such a policy is lapsed the reserve cannot be returned to the insured as a cash surrender value, but must be used to carry out the original contract with such a reduced income as it will suffice to pay for. The loss of the privilege of surrendering for cash will not be a serious disadvantage, for the reversionary annuity policy does not require the accumulation of very large reserve funds.

In the foregoing discussion so much emphasis has been laid upon the desirability of avoiding the accumulation of funds as insurance reserves that it is pertinent to consider what accumulations must be made by an organization issuing insurance in accordance with the plans we have outlined. When we inquire how the funds which must be held by such an organization in order to fulfill its obligations will compare in magnitude with the similar funds of an ordinary company we must be careful to take as a basis of comparison things really comparable. Under the ordinary plan, as claims occur their full amount is paid to the beneficiaries; but under the plans we are considering the beneficiaries are not to receive full settlement at once, but are to receive annuities or payment in installments. The office which administers life insurance under these plans will have in fact two quite distinct accounts: one for insurance and one for the installments and annuities. The insurance branch will receive the premiums of the insured, and when a claim occurs will disburse the commuted, or capitalized, value of the income which is to be provided, and it will be charged with such reserves as are necessary to provide for the contracts in this way. It will deal entirely with the persons insured, and such funds as it controls will be comparable in all ways with reserve accumulations of the ordinary company and will be open to the same objections. The annuity branch will receive the commuted value of the incomes or annuities from the insurance branch and will care for them as funds held in trust for the beneficiaries. These trust funds, held to carry out the provisions governing the manner of payment of indemnities for deaths which have occurred, are on an entirely different basis from the accumulations under the ordinary life contracts, and are not subject to the criticisms which apply to the latter.

In the case of insurance under the yearly term plan the reserve in the insurance account is inconsiderable, because in each year the claims occurring will consume all the premiums collected; the installment account will hold large funds, but these will not be subject to mortality contingencies at all.

Those reversionary annuities which provide for protection during the whole lifetime of the insured, but are paid for by premiums ceasing at sixty-four, will require an insurance reserve of the same character as the ordinary life reserve, but very much less in proportion to the premiums paid, as the table shows.

IV. TERMINAL RESERVES

RESERVES FOR \$1000.00 WHOLE LIFE INSURANCE, ISSUED AT AGE 35, ANNUAL PREMIUMS OF \$22.28 CEASING AT AGE 64, COMPARED WITH RESERVES FOR \$100.00 REVERSIONARY ANNUITY, ISSUED AT AGES 35-35, ANNUAL PREMIUMS OF \$20.66, CEASING AT AGE 64

Year of Insurance	Reserve for \$100.00 annuity	Attained Age of Insured	Reserve for \$1,000.00 insurance
5	\$ 28.00	40	\$ 76.00
10	62.00	45	166.00
15	100.00	50	271.00
20	142.00	55	392.00
25	191.00	60	528.00
30	256.00	65	688.00
35	227.00	70	747.00
40	191.00	75	800.00
45	151.00	80	849.00

In Table IV above the reserve required by a reversionary annuity of \$100 for insured and beneficiary both thirty-five years of age at the issue of the policy is compared with that of a \$1000 life insurance policy. In both cases the benefit is paid even though the insured die after the age of retirement. Annual premiums are assumed, the payment of which is limited to the period before retirement; that is, the last premium is payable when the insured reaches age sixty-four. It will be seen that the two reserves do not differ materially during the earlier years, but that the maximum reserve under the annuity policy is only \$256, which is reached in the thirtieth policy year. From that time on the reserve diminishes, and it vanishes when the

insured reaches ninety-six, which is the fictitious limit of age. Under the ordinary life insurance policy the reserve increases each year and finally, at age ninety-six, is equal to the sum insured. It grows very rapidly and at the end of the premium-paying period is \$688, or more than three times the reserve held under the annuity policy in the same year. The effect of the constant increase in the reserve on the whole-life policy is cumulative, so that the total reserve fund held for ordinary life insurance will grow more rapidly and attain a much higher maximum than the reserve held for reversionary annuity policies of a corresponding premium income.

The discussion which we have made leads us to conclude that other forms of insurance than those customarily offered will enable men whose incomes are derived from their salaries to provide more fully for the protection of their dependents than they can with the opportunities which are now available for insuring. It seems therefore highly desirable that the experiments should be made of establishing an insurance office which will offer the opportunity to secure insurance that is not bound up with a considerable element of investment. The establishment of such an insurance scheme for the benefit of professors would be not only directly beneficial to them but might perform a very useful service to a wider group of people by inducing the insurance companies to devote more attention to the need of insurance as distinguished from the need of opportunity for investment.

TABLES V AND VI

V. CHILD'S REVERSIONARY ANNUITY—(Continued)

YEARLY TERM PREMIUM PER \$100.00 ANNUITY, FIRST PAYMENT AT DEATH OF INSURED;
LAST PAYMENT WHEN BENEFICIARY IS TWENTY YEARS OF AGE.

Age of Insured	Age of Beneficiary								
	11	12	13	14	15	16	17	18	19
40	\$7.32	.....	.....	.....	.....	.....	.....	.....	.....
41	7.48	\$6.77	.....	.....	.....	.....	.....	.....	.....
42	7.66	6.93	\$6.18	.....	.....	.....	.....	.....	.....
43	7.86	7.11	6.34	\$5.53	.....	.....	.....	.....	.....
44	8.09	7.32	6.53	5.70	\$4.83	.....	.....	.....	.....
45	8.34	7.55	6.73	5.87	4.98	\$4.05	.....	.....	.....
46	8.64	7.82	6.97	6.08	5.16	4.20	\$3.21	.....	.....
47	8.96	8.11	7.23	6.31	5.35	4.36	3.33	\$2.27	.....
48	9.34	8.46	7.54	6.58	5.58	4.54	3.48	2.36	\$1.20
49	9.79	8.86	7.90	6.89	5.85	4.76	3.64	2.48	1.26
50	10.29	9.31	8.31	7.25	6.15	5.00	3.83	2.60	1.32
51	10.86	9.83	8.77	7.65	6.49	5.28	4.04	2.75	1.40
52	11.50	10.40	9.28	8.09	6.86	5.59	4.28	2.91	1.48
53	12.20	11.04	9.85	8.59	7.28	5.93	4.54	3.09	1.57
54	12.99	11.76	10.49	9.15	7.76	6.31	4.84	3.29	1.67
55	13.87	12.55	11.20	9.77	8.28	6.74	5.16	3.51	1.78
56	14.85	13.44	11.99	10.46	8.87	7.22	5.53	3.76	1.91
57	15.94	14.42	12.87	11.22	9.52	7.74	5.93	4.03	2.05
58	17.13	15.50	13.83	12.06	10.23	8.33	6.38	4.33	2.20
59	18.47	16.71	14.91	13.00	11.03	8.97	6.87	4.67	2.38
60	.....	18.04	16.10	14.04	11.91	9.69	7.42	5.04	2.57
61	17.41	15.19	12.88	10.48	8.03	5.46	2.78
62	16.46	13.96	11.36	8.70	5.91	3.01
63	15.14	12.32	9.44	6.42	3.26
64	13.38	10.25	6.97	3.54

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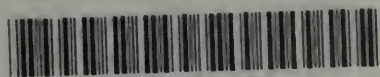
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